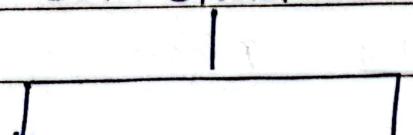


(L-1)

DSA  C++

Data Structures



Primitive

Non-Primitive

Linear

Non-Linear

Static

Dynamic

→ Tree

→ Graph

→ Table / set

Arrays

→ Vector

→ LinkedList

→ Stack

→ Queue

Fig: DSA Structure

### • How to solve a problem?

problem: Find sum of 2 numbers: a + b

① understand

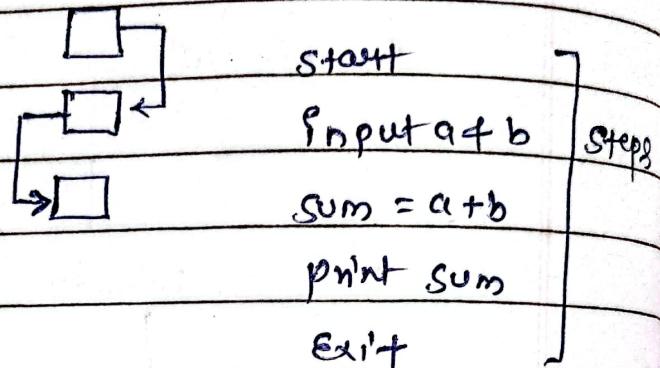
② Input

③ Solution

④ Code (C++, Java etc...)

## • Flowcharts & Pseudo code

Flowchart :- Diagram of a Solution



Components of flowchart :-

start / exit

Start

Exit

Input / output

Input a

print "Hi!"

Process

name = "Rauf"

Arrows



Decision

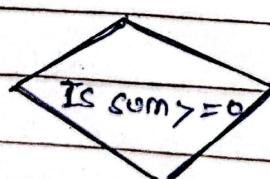


Diagram of Solution :-

Start

Input a + b

Sum = a + b

print sum

Exit



Pseudo-code :-

- General logic of solution.
- English language

Pseudo = नकली

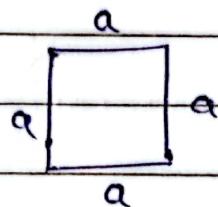
Pseudocode (sum of two numbers)

1. Input a & b }
2. sum = a + b } main
3. Print sum }
4. Exit (optional)

—○ Practice on —

(1)

Area of Square



$$\text{Area} = a \times a$$

$$= a^2$$

flowchart →

Start

Input a

$$\text{area} = a \times a$$

Print area

Exit

Pseudocode

1. Input a

2. area = a × a

3. Print area

4. Exit

4/7

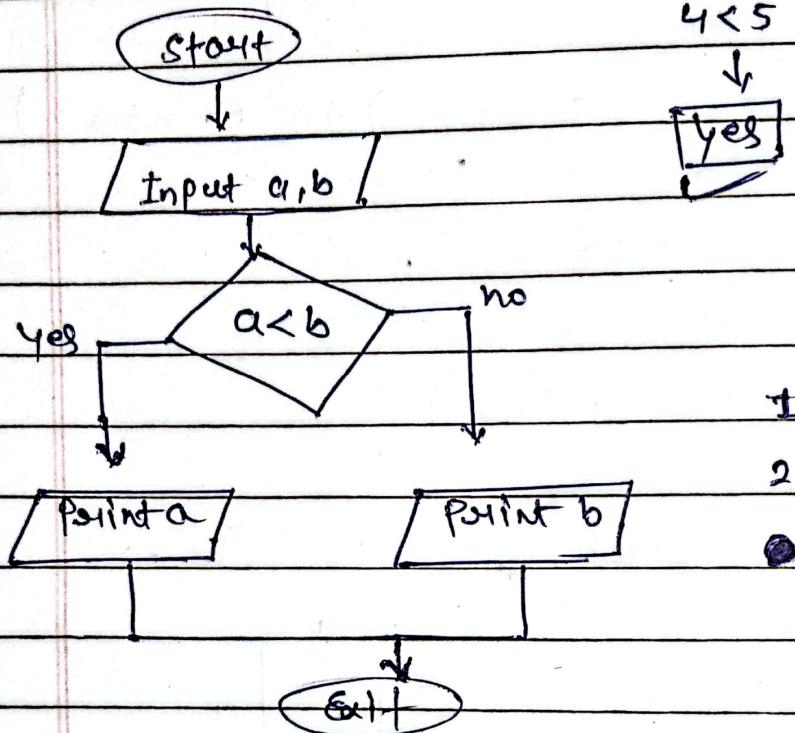
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(2)

Min of 2 Numbers :-

a, b

Flowchart

4 5

4 &lt; 5

↓

[Yes]

4 &gt; 5

↓

[No]

Pseudo Code

1. Input a, b

2. if a &lt; b

• print a

else

print b

3. exit

(3)

Sum of number from 1 to N

1 to N = 5

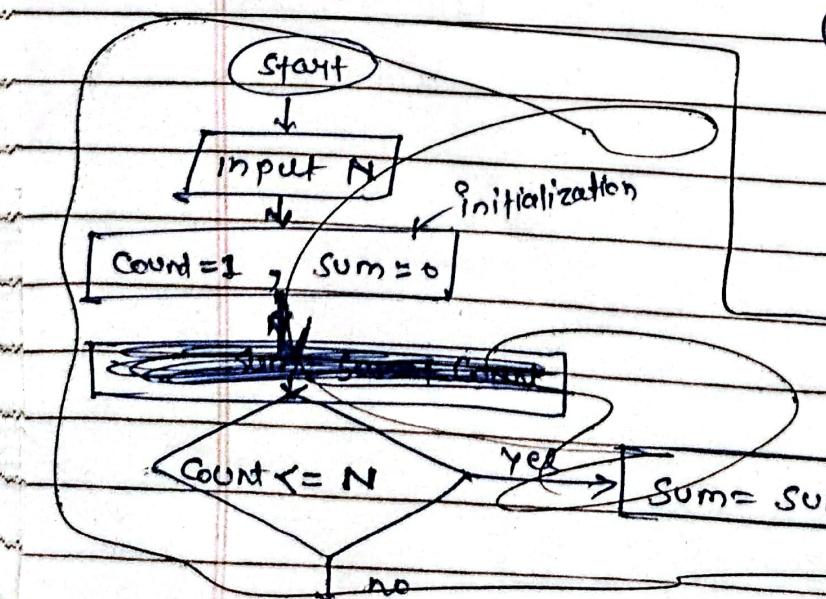
$$\text{sum} = 1 + 2 + 3 + 4 + 5 = 15$$

input N

$$\text{Count} = 1 \times 2 / 4 \times 8$$

$$\text{sum} = 0 + 1 + 2 + 3 + 4 + 5$$

= 25

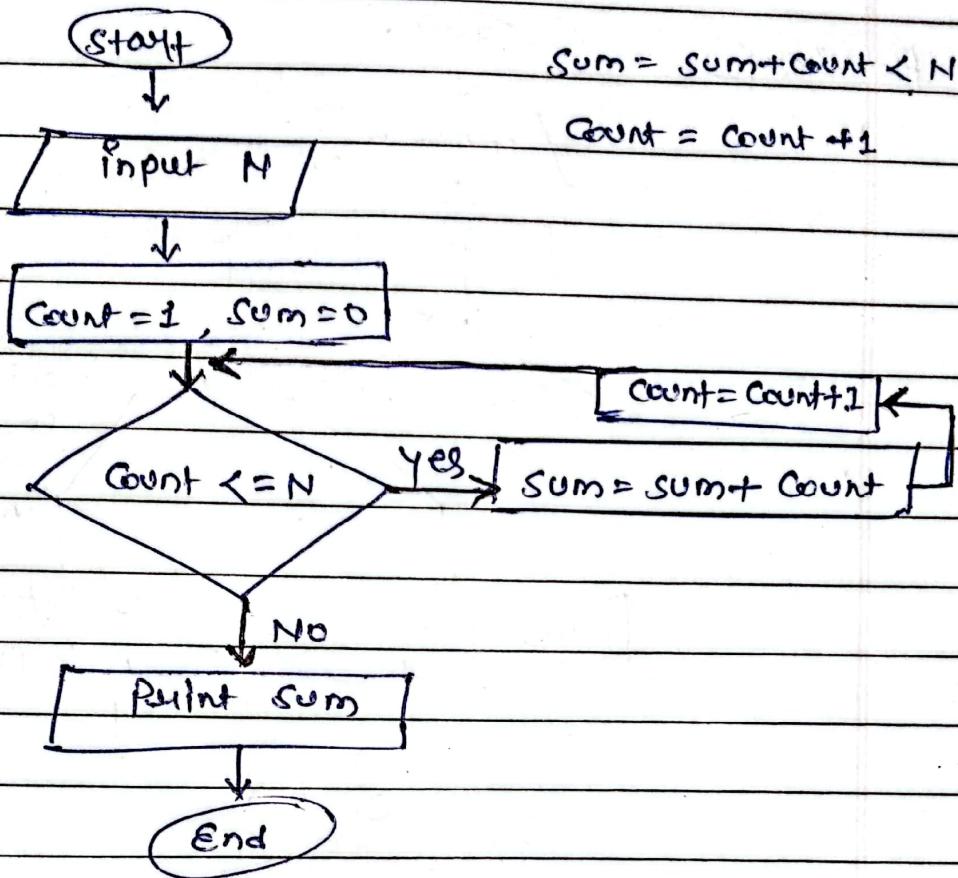


S/7

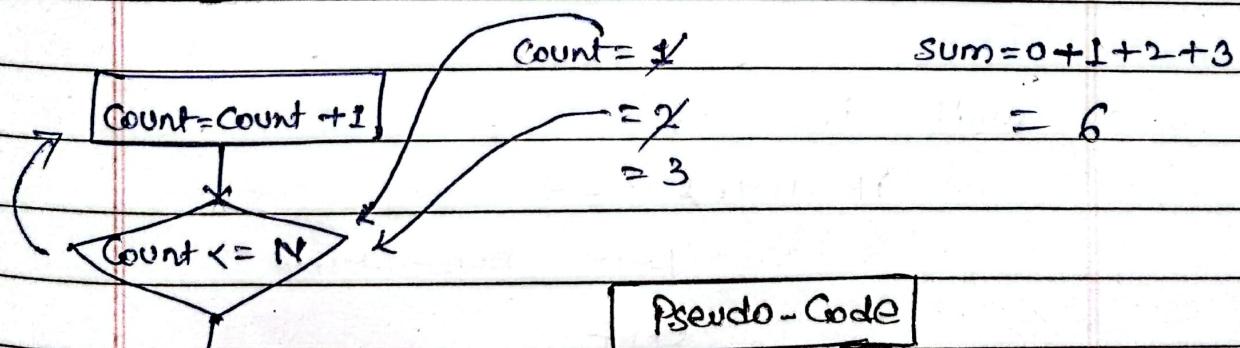
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## Flowcharts



## Dry Run

 $N = 3$ 

## Pseudo-Code

1. Input N
2. Count = 1, Sum = 0
3. while Count <= N

$$a = a + \delta$$

$$a + = 5$$

$$\text{sum} = \text{sum} + \text{count}$$

$$\text{Count} = \text{Count} + 1$$

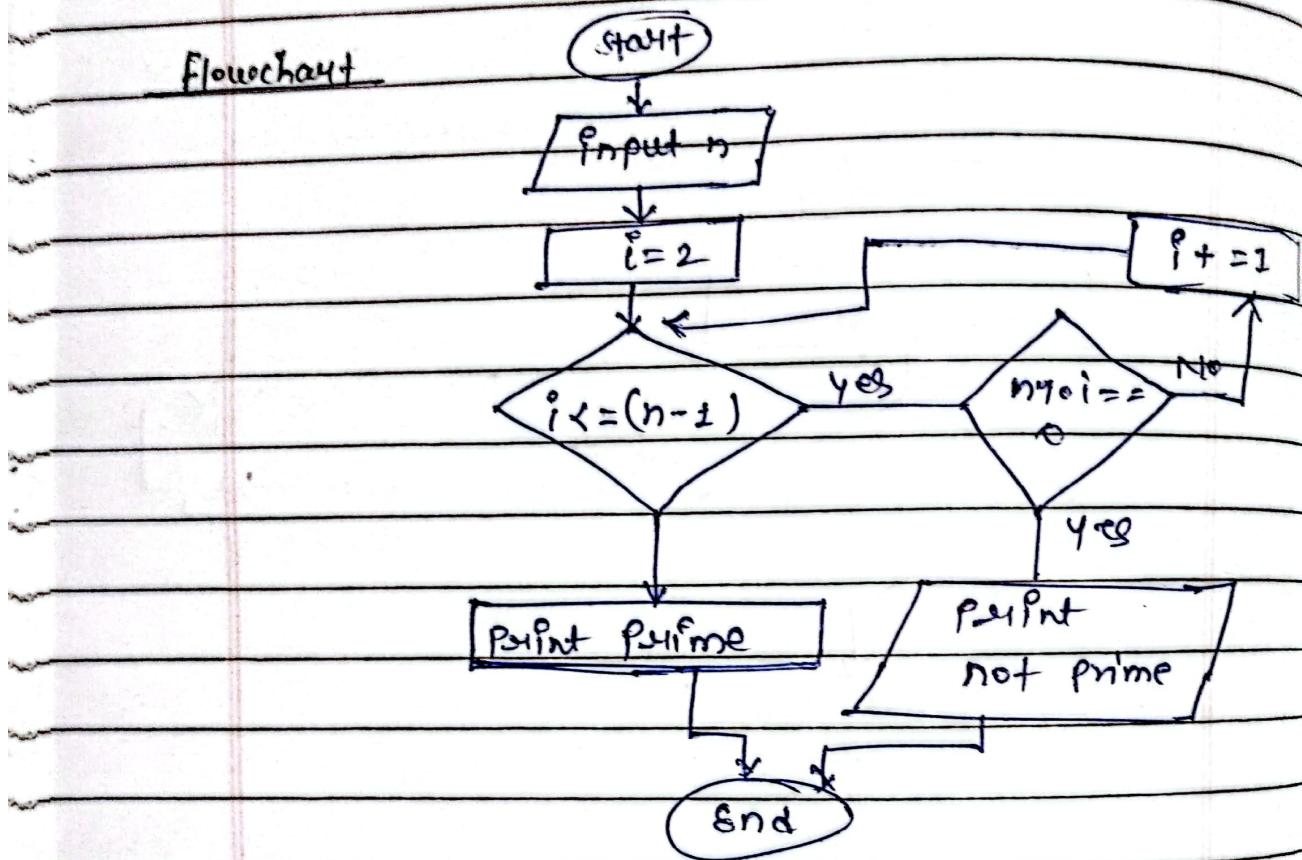
or  
Count++

4. Print Sum

5. Exit

④ Is number prime or not ?

Flowchart



Pseudo code

```

1. Input n
2. i = 2
3. while i <= (n-1)
   IF n % i == 0
      print non-prime
      exit
   ELSE
      i = i + 1
4. print prime
5. exit
  
```

Homework

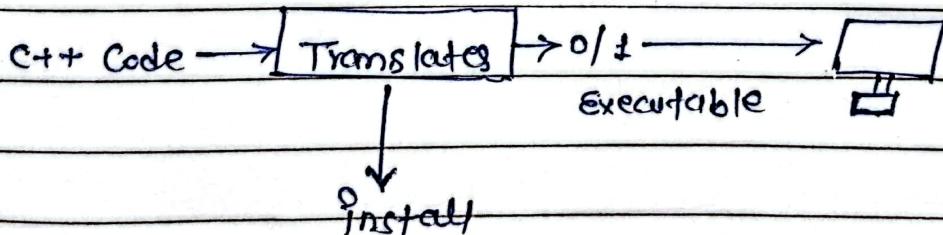
- (a) calculate "Simple Interest" from Principle (P)  
Rate (R) & Time (T).
- $$SI = P \times R \times T$$
- (b) Calculate max of 2 numbers.
- (c) Calculate factorial of a number N.
- (d) Given a person's age. Find if they should get a driving licence or not.

• How does Code run?

C++ code



VS Code Install.



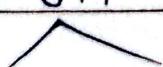
C++ Compiler

a. Visual studio Code

b. Set up c++

Windows

Mac



Date \_\_\_\_\_  
Page \_\_\_\_\_

How to Run C++ Program in  
Command prompt ?

F:\DSA C++ > g++ demo.cpp -o run ↴

F:\DSA C++ > run ↴

Hello DSA